UNITED STATES PATENT AND TRADEMARK OFFICE

MM

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/290,777	04/13/1999	DAVID STUTSMAN	20153	1239

7590 02/24/2004

PETER N LALOS
LALOS & KEEGAN
1146 NINETEENTH STREET NW
FIFTH FLOOR
WASHINGTON, MD 200363703

EXAMINER	
CADUGAN, ERICA E	
ART UNIT	**PAPER NUMBER**
3722	14

DATE MAILED: 02/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
P.O. BOX 1450
ALEXANDRIA, VA 22313-1450
www.uspto.gov

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 14

Application Number: 09/290,777
Filing Date: April 13, 1999
Appellant(s): STUTSMAN, DAVID

Peter N. Lalos
For Appellant

SUPPLEMENTAL EXAMINER'S ANSWER

This is in response to the remand to the examiner from the Board of Patent Appeals and Interferences of December 18, 2003.

(1) Status of Claims

The previous rejection of claims 6-10 and 16-20 under 35 U.S.C. 103(a) as being obvious over U.S. Pat. No. 1,761,841 (Nenninger) in view of Machinery's Handbook, 25th ed., 1996, pp. 2378-2379 is withdrawn since it appears that, indeed, impermissible hindsight would be necessary to reconfigure selected portions of the sleeves with respect to the housing to achieve the enlarged housing portion as previously asserted by Examiner.

The previous rejection of claim 15 under 35 U.S.C. 103(a) as being obvious over U.S. Pat. No. 1,761,841 (Nenninger) in view of Machinery's Handbook, 25th ed., 1996, pp. 2378-2379 is withdrawn since it appears that Nenninger does not teach the limitation of claim 15 "mounting a second sleeve on one of an inner and outer race of said second bearing so that said second bearing is axially displaceable relative to said second sleeve".

Claims 1, 3-5, and 11-14 stand rejected under 35 U.S.C. 103(a) as being obvious over U.S. Patent No. 1,761,841 (Nenninger) in view of Machinery's Handbook, 25th ed., 1996, pages 2378 and 2379.

Claims 6-10 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 16-20 are allowed.

(2) Prior Art of Record

1,761,841	NENNINGER	6-1930

Machinery's Handbook, 25th ed., New York, 1996, pp. 2378-2379

(2) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

Claims 1, 3-5, and 11-14 are rejected under 35 U.S.C. 103(a) as being obvious over U.S. Patent No. 1,761,841 (Nenninger) in view of Machinery's Handbook, 25th ed., 1996, pages 2378 and 2379.

Nenninger teaches a machine tool spindle 29 (page 1, line 86) that is fixed on one end and allowed to move axially with respect to the rotational axis of the spindle on the other end as the spindle expands and contracts due to variances in temperature (page 2, lines 22-37 and 128-130). The spindle is mounted in a column or housing C (see Figure 1), and is supported with a roller bearing 74 (Figure 5) at one end of the spindle and with bearings 25, 26 (Figure 4) on the opposite end of the spindle. The bearings have inner and outer races (Figures 4 and 5) and are seated against outwardly facing annular surfaces of sleeves 70 and 18, respectively (Figures 4 and 5). The bearing 74 is mounted on the rear of the spindle (page 1, line 62), and floats or axially moves within sleeve 70 (page 2, lines 110-130). Rigid annular sleeve 70 is disposed between bearing 74 and the housing (Figure 5) and is fixed with respect to (or "bonded to") the housing via stud screw 72 (Figure 5 and page 2, lines 114-116). The spindle 29 has a nose 30 that is adapted to engage a cutter arbor or "tool holder" (page 1, column 85-87). As shown in Figure 5, it appears that the bearing seat is slightly oversized with respect to the sleeve 70. Nenninger also specifically teaches that the bearing cone 27 is press fit onto the spindle (page 2, lines 16-19), and states that the other bearing 74 "floats with the end of the spindle" (page 2,

lines 128-129), implying that the bearing 74 is mounted so as to be fixed to the spindle and is thus also press fit onto the spindle.

Specifically regarding claim 12, as shown in Figures 4 and 5, it appears that the annular inner surfaces of the openings which seat the sleeves 70 and 18 are of a slightly larger diameter than the outer diameters of the annular outer surfaces of the sleeves 70 and 18.

Specifically regarding claim 13, Nenninger does not specifically teach that the diametral difference is in the range between 0.010 and 0.015 inches.

Nenninger does not teach that the sleeves are held in place via an epoxy resin adhesive, but instead teaches the use of stud screw 72 to fix sleeve 70 as described above, and also teaches the use of washer ring 20 in conjunction with bolts 21, and clamp nut 33 with set screw 34 to fix sleeve 18 (see Figure 4).

Specifically regarding the epoxy resin adhesive, Machinery's Handbook, 25th ed., 1996, pages 2378 and 2379 teaches the use of "epoxy resin adhesive" to bond metal to metal, and further teaches that appropriate "curing parameters" are selected based on the intended use of the adhesive. Machinery's Handbook further teaches the benefits of such adhesives over mechanical fastening devices. Particularly note page 2378, paragraphs 1 and 2, which states:

> Joining materials with adhesives offers significant benefits compared with mechanical methods of uniting two materials.
>
> Among these benefits are that an adhesive distributes a load over an area rather than concentrating it at a point, resulting in a more even distribution of stresses. The adhesive bonded joint is therefore more resistant to flexural and vibrational stresses than, for example, a bolted, riveted, or welded joint. Another benefit is that an adhesive forms a seal as well as a bond. This seal prevents the corrosion that may occur with dissimilar metals, such as aluminum and magnesium, or mechanically fastened joints, by providing a dielectric insulation between the substrates. An adhesive also joins irregularly shaped surfaces more easily than does a mechanical fastener. Other benefits include negligible weight addition and virtually no change to part dimensions or geometry.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have applied epoxy resin adhesive (rather than the fixing arrangement utilizing the stud screw 72 described by Nenninger) to one or both of the outer surface of the fixed sleeves 70 and 18 taught by Nenninger, or the inner surface of the housing taught by Nenninger, to fix the sleeves with respect to the housing, and to have let this adhesive set (or "cure" as taught by the Machinery's Handbook) for the purpose of providing Nenninger's device with a load that is distributed over an area rather than concentrating it at a point, resulting in a more even distribution of stresses, or for providing a joint that is more resistant to flexural and vibrational stresses as taught by Machinery's Handbook.

Specifically regarding claim 13, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have made the inner annular surface of the housing as much larger than the outer surface of the sleeve as was desired or expedient, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

(3) Response to Remand

Section 1:

In section 1, the Board of Patent Appeals and Interferences (BPAI) requests "clarification of the exact modifications intended by the examiner, some idea of what the examiner believes the resulting structure would look like, and for some indication on the examiner's part as to where, absent hindsight derived from appellant's application, any teaching or suggestion for such changes may be found" for the examiner's contention of the following:

Specifically regarding the enlarged portion of the seat, it is immaterial to the function of Nenninger's invention as to whether the lips or flanges which form the outwardly facing annular surfaces are part of the sleeve, or whether these flanges are separate from the sleeves and are integral with the housing C (which if these flanges are integral with the housing, these flanges form enlarged openings within the housing by virtue of the smaller opening at the radially inner surfaces of the flanges). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have made the flanged portions of the sleeves integral with the housing, since it has been held that forming in one piece an article which has formerly been formed in two pieces and put together involves only routine skill in the art. Howard v. Detroit Stove Works, 150 U.S. 164 (1893).

However, the rejection of the claims (6-10 and 16-20) relating to this "enlarged" portion has been withdrawn since it appears that, indeed, impermissible hindsight would be necessary to reconfigure selected portions of the sleeves with respect to the housing to achieve the enlarged housing portion as previously asserted by Examiner.

Section 2:

In section 2, the BPAI requested that the examiner "provide some indication as to where in the disclosures of Nenninger and the Machinery's Handbook the examiner finds a teaching or suggestion of the method steps as set forth in claims 11, 15 and 16".

The rejection of claims 15 and 16 has been withdrawn, so examiner will focus on claim 11.

With respect to claim 11, it is noted that the bore of the housing C through which the spindle 29 extends and in which the bearing 74 is seated must exist, and thus must inherently be "formed" in some way, prior to any of the bearings, sleeves, or spindle being inserted therein.

Additionally, regarding the limitation "mounting a spindle on one of an inner race and an outer race of a bearing", it is noted that the spindle 29 has an inner race of the bearing 74 mounted thereto (Figures 4 and 5, also note that Nenninger specifically teaches that the bearing

cone 27 is press fit onto the spindle, per page 2, lines 16-19, and states that the other bearing 74 "floats with the end of the spindle", per page 2, lines 128-129, implying that the bearing 74 is mounted so as to be fixed to the spindle and is thus also press fit onto the spindle, noting that there does not appear to be any separate structure present to hold the bearing 74 "fixed to the spindle").

Furthermore, regarding the limitation "mounting a sleeve on the other of said races of said bearing so that said bearing is displaceable axially relative to said sleeve", the sleeve 70 is mounted on the outer race of bearing 74 (see Figure 5). It is noted that Nenninger explicitly teaches that the bearing 74 "floats with the end of the spindle inside the bore of the sleeve 70" (page 2, lines 128-130).

Regarding the limitation "applying an adhesive bonding material to at least one of a surface of said sleeve and a surface of said at least one bearing seat", as described in the rejection, Nenninger does not teach using adhesive, but instead teaches the use of stud screw 72 to fix sleeve 70 with respect to the housing (Figure 5 and page 2, lines 114-116), and thus with respect to the "seat" or location of the bearing within the housing, as described above.

However, specifically regarding the adhesive, Machinery's Handbook, 25th ed., 1996, pages 2378 and 2379 teaches the use of "epoxy resin adhesive" to bond metal to metal and further teaches the benefits of using such adhesives over mechanical fastening devices.

Particularly note page 2378, paragraphs 1 and 2, which states:

> Joining materials with adhesives offers significant benefits compared with mechanical methods of uniting two materials.
>
> Among these benefits are that an adhesive distributes a load over an area rather than concentrating it at a point, resulting in a more even distribution of stresses. The adhesive bonded joint is therefore more resistant to flexural and vibrational stresses than, for

> example, a bolted, riveted, or welded joint. Another benefit is that an adhesive forms a seal as well as a bond. This seal prevents the corrosion that may occur with dissimilar metals, such as aluminum and magnesium, or mechanically fastened joints, by providing a dielectric insulation between the substrates. An adhesive also joins irregularly shaped surfaces more easily than does a mechanical fastener. Other benefits include negligible weight addition and virtually no change to part dimensions or geometry.

It is noted that for the sleeve 70 to be fixed relative to the housing with the adhesive taught by Machinery's Handbook, rather than the stud screw 72 taught by Nenninger (see Figure 5 of Nenninger), the adhesive would necessarily have to be applied to "at least one of a surface of said sleeve and a surface of said at least one bearing seat", the "bearing seat" being the location of the housing "seating" the bearing (see Figure 5 of the Nenninger reference).

Regarding the limitation "mounting said spindle with said bearing and said sleeve, on said housing so that said surface of said sleeve is disposed adjacent to said surface of said at least one bearing seat with said adhesive bonding material adjoining said surfaces", it is noted that the spindle 29, bearing 74, and sleeve 70 are mounted in the housing C such that the radially outer surface of the sleeve 70 is disposed adjacent the bore surface of the housing constituting the "bearing seat", and that for the adhesive described above to be used to relatively fix the sleeve 70 with respect to the housing C, the adhesive would necessarily have to be located between this radially outer surface of sleeve 70 and the surface of the bore of the housing C (see Figure 5).

Regarding the limitation "allowing said bonding material to set to rigidly secure said sleeve to said housing, permitting said bearing to displace along an axial line of travel relative to said sleeve", firstly, Nenninger explicitly teaches that the bearing 74 is displaceable along an "axial line of travel" relative to sleeve 70 (page 2, lines 128-130). Secondly, regarding the setting of the material, Machinery's Handbook teaches that appropriate "curing parameters"

(page 2378, paragraph 3, lines 6-7), i.e., setting parameters, are selected based on the intended use of the adhesive.

It is noted that based on the teachings of Nenninger re the sleeve being "fixed" to the housing C via the stud screw 72 (i.e., a "rigid securing" of the sleeve with respect to the housing) such that the bearing 74 can move axially therein as described previously and the teachings of Machinery's Handbook of the benefits of adhesives over bolted joints, for example (page 2378 specifies that "[t]he adhesive bonded joint is therefore more resistant to flexural and vibrational stresses than, for example, a bolted, riveted, or welded joint", for example), and the teaching of the Machinery's Handbook about selecting appropriate "curing parameters" (page 2378 sets forth "[a]ppropriate surface preparation, curing parameters, and matching the strength and durability characteristics of the adhesive to its intended use are essential"), one of ordinary skill in the art that would be motivated to substitute an adhesive for the stud screw 72 of Nenninger to achieve any of the benefits described in Machinery's Handbook, such as the resistance to stresses, would necessarily be motivated to select the appropriate adhesive and curing or "setting" times therefor in order to achieve the desired fixation of the sleeve 70 to the housing C.

Regarding the specific reasoning for withdrawing the rejection of claim 15, it is noted that Nenninger specifically teaches the front sleeve 18 is positively (fixedly) held in the housing (page 2, lines 88-92). Additionally, the front bearings 25, 26 are prevented from moving axially in one direction via the rib 22 of the sleeve 18 (Fig. 4). Also, bearing 25 is prevented from moving axially in the other direction via the cap plate 63 (Fig. 4, page 2, lines 67-72), and bearing 26 is prevented from moving axially in the other direction (opposite the rib 22) via washer 35 (Fig. 4, page 2, lines 5-15). Additionally, Nenninger teaches that the front cone 27 is

press fit onto the spindle to prevent creeping action of the bearing (page 2, lines 16-19), and that the front end of the spindle is held against any possible movement relative to the column or housing C (page 2, lines 27-37). With the bearings fixed in place relative to the spindle as described, and the spindle held in place relative to the housing or column C as described, there is no second bearing in the Nenninger reference that is "axially displaceable relative to said second sleeve" as set forth in claim 15.

Section 3:

In section 3, the BPAI requested that the examiner provide "a response on the record to the arguments raised by appellant in the reply brief" filed by the appellant on February 26, 2002.

Response to Reply Brief:

Group I

Appellant asserted the following:

> In arriving at the rejection, the Examiner has unreasonably broadened the interpretation of "bearing seat" and "sleeve" in Applicant's claims to encompass the disclosures of Nenninger and the Machinery's Handbook. *See In re Marosi,* 218 USPQ 289, 292 (Fed. Cir. 1983) (claims are not read in a vacuum, and limitations therein must be interpreted in light of the specification in giving them their broadest reasonable interpretation).
>
> The Examiner broadened the definition of "bearing seat" to include the cylindrical aperture for holding all of the components as disclosed in Nenninger. Applicant has disclosed the bearing seat in the claims, specification and drawings as part of a recess in the housing, i.e. "a housing defining a bearing seat." (See Specification page 4, line 20 through page *5,* line 15 and Figures 1-4, items 14 and 15). *See In re Vogel,* 164 USPQ 619, 622 (CCPA 1970) (the specification can be used to interpret claim language when the specification provides definitions of terms appearing in the claims). Furthermore, one having ordinary skill in the art would know a bearing seat provides a location for positioning the bearing and restricting the lateral movement of the bearing from the seat. The aperture in Nenninger that the Examiner construes as the bearing seat performs none of these functions, rather it is simply a hole bored through the housing. The portion of Nenninger which defines the bearing seat (Nenninger, Figure 5, item 73) is the "sleeve" (Nenninger, Figure 5, item 70), not the housing. Such is even stated in Nenninger in page 2, column 2, lines 117-118, "this sleeve has an enlarged bore ... to receive the bearing

unit."

However, this is not persuasive for many reasons.

Firstly, as set forth in the Examiner's Answer, regarding the broadest reasonable interpretation of the term "bearing seat" set forth in the present claims, note that claim 1 merely sets forth "a housing having at least one bearing seat" and "a bearing having an inner race and an outer race disposed in said at least one bearing seat". Relating this language to the invention described by Nenninger, any element within which the inner and outer races of Nenninger's bearing 74 are "disposed" that is also connected to the housing C would constitute the claimed "seat". First note that the bearing 74 is mounted on the rear of the spindle (page 1, line 62), and floats or axially moves within sleeve 70 (page 2, lines 110-130). Secondly, note that rigid annular sleeve 70 is disposed between bearing 74 and the housing (Figure 5) and is fixed with respect to (or "bonded to") the housing via stud screw 72 (Figure 5 and page 2, lines 114-116). Thus, the sleeve 70 is connected to the housing, and the portions of the sleeve 70 which contact the bearing 74 can be considered to constitute the claimed bearing seat set forth in for example, claim 1.

Additionally, Appellant has asserted that when interpreted in light of the specification, the limitation "bearing seat" is disclosed as "part of a recess in the housing, i.e., 'a housing defining a bearing seat'." However, it is noted that, firstly, even *with* Appellant's asserted language from the specification, broadly speaking, the portions of the sleeve 70 which contact the bearing 74, described previously, are part of a recess (of the sleeve) that is located "in" the housing (see Figure 5). However, in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant

relies (i.e., some apparently unspecified further language relating to the structure of the bearing seat, or any language relating to a "recess") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). It is further noted that there does not appear to be any language or specific definition of the term "bearing seat" in either the specification OR the claims that would preclude the interpretation provided by the examiner.

Alternatively, it is noted that the bore of the housing seating the sleeve 70 can also be considered a "bearing seat" since the bore itself is "recessed" within, or just plain located "in" the housing (see Figure 5). It is noted that no "enlarged portion" of a bore to seat the bearings is set forth in any of the now-rejected claims, and that although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Additionally, Appellant specifically asserted the following:

> Furthermore, one having ordinary skill in the art would know a bearing seat provides a location for positioning the bearing and restricting the lateral movement of the bearing from the seat. The aperture in Nenninger that the Examiner construes as the bearing seat performs none of these functions, rather it is simply a hole bored through the housing. The portion of Nenninger which defines the bearing seat (Nenninger, Figure 5, item 73) is the "sleeve" (Nenninger, Figure 5, item 70), not the housing. Such is even stated in Nenninger in page 2, column 2, lines 117-118, "this sleeve has an enlarged bore ... to receive the bearing unit."

However, it is noted that, firstly, that Appellant agrees that the bore or recess within the sleeve 70 within which the bearing 74 is located serves to "seat" the bearing, but apparently disagrees that such recess is located in the housing, i.e., that it meets the limitation "a housing

having at least one bearing seat" of claim 1 and the similar limitation in claim 11. However, as stated previously, as viewed in Figure 5 of the Nenninger reference, the bore or recess within the sleeve is located "within" the housing.

Secondly, apparently considering the alternative interpretation of the bearing seat being the inner surface of the bore in the housing that seats the sleeve 70, it is noted that while Appellant asserts that "the aperture in Nenninger that the Examiner construes as the bearing seat performs none of these functions, rather it is simply a hole bored through the housing", it is also noted that Appellant's bearing seat as disclosed is also a "hole bored through the housing" (see Figures 3 and 4, for example, noting that 14a is described in the specification on page 5, lines 4-5 as being an annular side wall 15a of a bearing seat, and that 14a is a side wall of a part of a bore extending through housing section 11a of the housing 11). It is noted that the inner surface of the bore in the housing of Nenninger that seats sleeve 70 "provides a location for positioning the bearing and restricting the lateral movement of the bearing from the seat" just like the side wall 14a in the housing 11 does for the bearings 18, 19 spaced therefrom by sleeve 17 in Appellant's disclosed invention (see Appellant's Figures 3-4, for example).

Additionally, regarding the sleeve, Appellant has asserted the following:

> Applicant's invention further discloses a sleeve disposed between a bearing disposed in a bearing seat and the bearing seat (See Drawings, Figure 2, items 17 and 20). The sleeve becomes the effective bearing seat once the bonding agent has set to provide axial alignment of the spindle and bearings. As defined in the specification, the sleeve is of a cylindrical shape (See Specification page 5, lines 5-15 and Figures 1-4, items 17 and 20). Furthermore, a sleeve is defined as a tubular part designed to fit over another part. Merriam-Webster's Collegiate Dictionary, definition of sleeve, page 1100 (10th ed. 2000). Applicant submits the "sleeve" as used in Nenninger and that used by the Examiner is inconsistent with the definition of sleeve in light of the accepted definition and that disclosed in Applicant's specification. The sleeve as disclosed by Nenninger and used by the Examiner is an insert having a complex structure for providing a bearing seat and providing oil reserves to the spindle. It is not of a tubular shape, nor does it fit into a

bearing seat between the bearing and the bearing seat. Rather, it is designed to contain the bearing seat and provide oil to the spindle.

However, this is not persuasive.

It is noted that "tubular", within Appellant's provided dictionary definition of the term "sleeve", is defined by Merriam Webster's Collegiate Dictionary, 10th ed., as "having the form of or consisting of a tube", and that "tube" is defined by the same dictionary as "**any of various** usu. cylindrical **structures or devices**: as **a:** a hollow elongated cylinder; esp: one to convey fluids".

While it is true that Nenninger's sleeve 70 (specifically described by Nenninger as a "sleeve", see page 2, lines 113-115, for example) is a stepped cylindrical tube, it is still a tube or sleeve nonetheless. Note that sleeve 70 is a hollow elongated stepped cylinder (see Figures 1 and 5).

Regarding the fact that Nenninger's sleeve 70 has more features than Appellant's claimed (or even Appellant's disclosed) sleeve, e.g., the "complex structure" for "providing oil reserves to the spindle", it is noted that claims 1 and 11 each use the open transitional phrase "comprising", and therefore it is noted that the additional structure, e.g., oil ducts, of the sleeve 70 taught by Nenninger is not precluded by the language in the claims (nor by any sort of specific definition in the specification precluding any alternatives to the disclosed simple cylindrical sleeve, particularly noting that Appellant's specification teaches the "it will be evident that there are a number of changes, adaptations, and modifications for the present invention which come within the province of those persons having ordinary skill in the art to which the aforementioned invention pertains" and that "it is intended that all such variations not

departing from the spirit of the invention be considered as within the scope thereof as limited solely by the appended claims", see page 11, last paragraph).

Additionally, it is noted that the features upon which applicant relies (i.e., that the sleeve must be of noncomplex shape and must not have other features such as the provision of oil ducts) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Thus, regarding Group I, examiner contends that the claims have been properly interpreted.

Group II

Appellant asserts that "the method claimed will not produce a structure resulting from the allegedly obvious combination of Nenninger and the Machinery's Handbook because the method as a whole is not disclosed and the method is not possible using the assembly disclosed by Nenninger"..

Specifically, firstly, in the paragraph spanning pages 6-7 of Appellant's reply brief, it appears that Appellant believes that neither Nenninger nor Machinery's Handbook teach the step of "forming a bearing seat in a housing" because the "hole bored through the housing" of Nenninger cannot be considered the claimed "bearing seat". Additionally, Appellant asserts that because the sleeve receives the bearing unit, the housing bore cannot be considered to provide the claimed "bearing seat" (see last two lines of page 6 through the end of the paragraph).

However, it is noted that the bore of the housing seating the sleeve 70 can be considered a "bearing seat" as claimed since the bore itself is "recessed" within, or just plain located "in" the

housing (see Figure 5). It is noted that no "enlarged portion" of a bore to seat the bearings is set forth in any of the now-rejected claims, and that although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Additionally, Appellant specifically asserted the following:

> One having ordinary skill in the art would know a bearing seat provides a location to install the bearing and restrict the lateral movement of the bearing relative to the housing. The aperture in Nenninger that the Examiner refers to as the bearing seat performs none of these functions, rather it is simply a hole bored through the housing. The portion of Nenninger which defines the bearing seat (Nenninger, Figure 5, item 73) is the "sleeve" (Nenninger, Figure 5, item 70), not the housing. Such is even stated in Nenninger in page 2, column 2, lines 117-118, "this sleeve has an enlarged bore ... to receive the bearing unit." Thus, to accomplish the step of forming a bearing seat in the housing of Nenninger, the bearing seat is necessarily formed in the sleeve of Nenninger (Nenninger Figure 5, item 70).

However, it is noted that while Appellant asserts that "the aperture in Nenninger that the Examiner construes as the bearing seat performs none of these functions, rather it is simply a hole bored through the housing", it is also noted that Appellant's bearing seat as disclosed is also a "hole bored through the housing" (see Figures 3 and 4, for example, noting that 14a is described in the specification on page 5, lines 4-5 as being an annular side wall 15a of a bearing seat, and that 14a is a side wall of a part of a bore extending through housing section 11a of the housing 11). It is noted that the inner surface of the bore in the housing of Nenninger that seats sleeve 70 "provides a location for positioning the bearing and restricting the lateral movement of the bearing from the seat" just like the side wall 14a in the housing 11 does for the bearings 18, 19 spaced therefrom by sleeve 17 in Appellant's disclosed invention (see Appellant's Figures 3-4, for example).

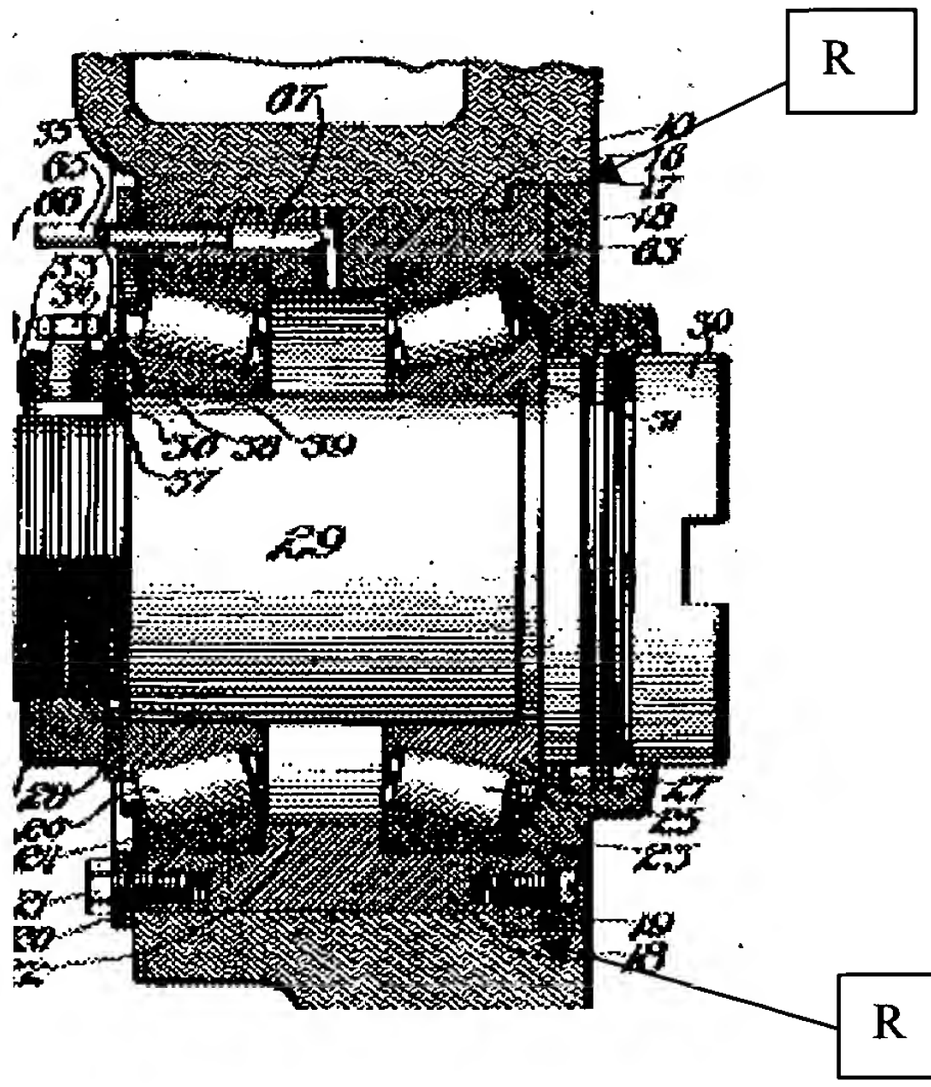
> Additionally, Appellant has asserted that
>
> The assembly of Nenninger to which the Examiner relies cannot be made by Applicant's method. The necessary method to which Nenninger is assembled is by inserting the spindle from a right side of Figure *5* because as shown in Figure 2, gear drive 40 would not fit through aperture 71.

However, this is not persuasive. It is noted that based on Appellants' reasoning with respect to the aperture 71, it appears that the gear drive 40 shown in Figure 1 would not fit through aperture 16 in the wall 10 of the right side of Figures 1, 4, and 5, any more than it would fit through the aperture 71 from the left as asserted by Appellant, and thus Appellant's argument that Nenninger's device must be assembled by inserting the spindle from a right side of Figure 5 is not persuasive.

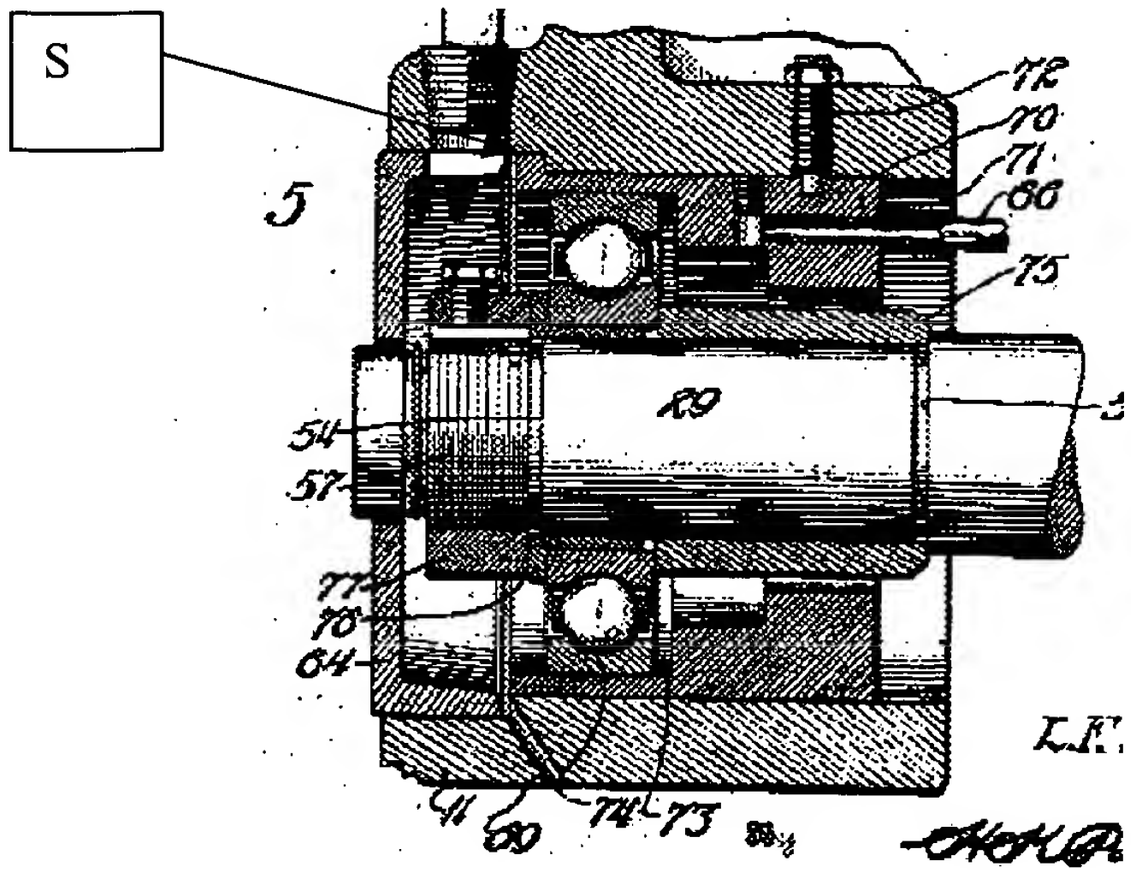
It appears that the only way to produce Nenninger's structure is for the spindle to be formed in two pieces. Note that the both the stepped portions of the sleeve 70 that extend radially relative to the longitudinal spindle axis would preclude the sleeve 70 from being assembled to the spindle after the bearing is assembled to the spindle 29 (see Fig. 5). In other words, the sleeve 70 must be assembled to the spindle 29 prior to the bearing 74 being assembled to the spindle 29.

Likewise, on the opposite end of the spindle, the rib 22 of sleeve 18 would preclude the sleeve 18 from being assembled to the spindle 29 after bearings 25, 26 are assembled to the spindle. In other words, the sleeve 18 must be assembled to the spindle 29 prior to the bearings 25, 26 being assembled to the spindle.

Furthermore, the radially extending portion of sleeve 18, labeled below in the partial reproduction of Figure 4 as "R", would indicate that the portion of the spindle shown in Figure 4 must be inserted into the housing from the right side of the figure (4).



Additionally, the sleeve 70 on the opposite end of the spindle 29 has a radially stepped portion, labeled in the partial reproduction of Figure 5 as "S", which would indicate that the portion of the spindle shown in Figure 5 must be inserted into the housing from the left side of Figure 5.



Since the entire spindle as a whole cannot be inserted from both the right and the left sides of the device, thus the spindle must inherently be formed of two parts; a right part inserted from the right of Figures 4 and 1, and a left part, inserted from the left of Figures 5 and 1, (and it appears that the spindle parts would necessarily be inserted without the gear drive 40 thereon, with the gear drive 40 being assembled thereon prior to connecting the two spindle parts).

Regarding each specific limitation of claim 11, see Section 2 above for a detailed description of where in the references each limitation is found.

Additionally, Appellant has asserted the following:

> Additionally, all claim limitations must be taught or suggested in the prior art. *See In re Roy/ca,* 180 U.S.P.Q. 580 (CCPA 1974). The Examiner stated the bearing seat "appears to be slightly oversized" in the rejection of the claims 12 and 13 by simply looking at Figure 5 of Nenninger. Examiner Answer page 3, lines 2 1-22. Applicant submits that nowhere in Nenninger or the Machinery's Handbook is there a suggestion or a disclosure of anything oversized, especially the bearing seat. Applicant simply does not understand how Figure 5 of the drawings provides a basis for this observation. One having ordinary skill in the art would know that to reduce vibration and to assure proper alignment of the spindle, the aperture and the "sleeve" 70 fitting therein in the spindle assembly in Nenninger would have to be precision machined to assure a proper fit to prevent such vibration and maintain a proper alignment.

However, Examiner notes that there is no disclosure indicating that sleeve 70 is interference fit into the housing (into a “bearing seat” of the housing bore), and in fact, Nenninger instead teaches that the sleeve 70 is “locked in place within aperture 71 in the rear of the column as by the stud screw 72” (page 2, lines 113-116). Thus, the aperture 71 must inherently be larger by some amount, however small, than the outer diameter of the sleeve 70, in order for the sleeve to be able to be fit into the bore. This is evidenced by Figure 5, which shows

the inner diameter of the housing being located outside of the outer diameter of the sleeve, and which shows the use of the stud screw 72 to lock the sleeve in place.

Examiner further notes that the fact that the aperture and the sleeve 70 fitting therein in the spindle assembly in Nenninger "would have to be precision machined to assure a proper fit to prevent such vibration and maintain a proper alignment" is not in dispute, and the relevance of this statement is unclear. Note that slight diametral differences between the two members on the order of 0.010 and 0.015" (claim 13) would appear to constitute "precision" machining that would enable Nenninger's spindle to function as desired. Thus, re claim 13, to make the amount of oversize, which some oversize must inherently exist as described above, in the specific range claimed in claim 13 would not appear to preclude Nenninger's spindle from functioning as intended.

Appellant concluded the reply brief stating:

> In accordance with the above reasons and those stated in the Appeal Brief, Applicant requests the rejections of the claims be reversed and the application passed to issuance.

However, for the reasons set forth in detail above, it is believed that the rejections of the claims should be sustained.

Section 4 (of the Remand):

In section 4, BPAI stated the following:

> While we recognize what appellant's disclosed invention entails, on REMAND, the examiner may wish to consider whether claim 1 on appeal, for example, actually requires the sleeve set forth therein to be located "between the bearing seat and the bearings" as appellant has contended.

Examiner agrees that claim 1 does not require the sleeve be located "between the bearing seat and the bearings" as contended by Appellant.

As set forth in the Examiner's Answer (pages 6-7):

> However, regarding the broadest reasonable interpretation of the term "bearing seat" set forth in the present claims, note that claim 1 merely sets forth "a housing having at least one bearing seat" and "a bearing having an inner race and an outer race disposed in said at least one bearing seat". Relating this language to the invention described by Nenninger, any element within which the inner and outer races of Nenninger's bearing 74 are "disposed" that is also connected to the housing C would constitute the claimed "seat". First note that the bearing 74 is mounted on the rear of the spindle (page 1, line 62), and floats or axially moves within sleeve 70 (page 2, lines 110-130). Secondly, note that rigid annular sleeve 70 is disposed between bearing 74 and the housing (Figure 5) and is fixed with respect to (or "bonded to") the housing via stud screw 72 (Figure 5 and page 2, lines 114-116). Thus, the sleeve 70 is connected to the housing, and the portions of the sleeve 70 which contact the bearing 74 can be considered to constitute the claimed bearing seat set forth in for example, claim 1.

Thus, in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the sleeve being located "between the bearing seat and the bearings") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion:

For at least the foregoing reasons, as well as the reasons previously set forth in the Examiner's Answer, it is believed that the rejections of claims 1, 3-5, and 11-14 as being obvious under 35 USC 103(a) over Nenninger in view of Machinery's Handbook should be sustained.

Respectfully submitted,

Erica E. Cadugan
Patent Examiner

Andrea L. Wellington
Supervisory Patent Examiner

Daniel Howell
Primary Examiner
Conferee

eec
February 20, 2004

PETER N LALOS
LALOS & KEEGAN
1146 NINETEENTH STREET NW
FIFTH FLOOR
WASHINGTON, MD. 20036-3703